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THE SHIPS OF THE ROYAL NAVY

1422

H.M.S. INFLEXIBLE.

Published Dec 1st 1880 by Griffin & C° Portsmouth.

THE

ROYAL NAVY;

1872—80.

IN A

SERIES OF ILLUSTRATIONS

Lithographed in Colours,

FROM ORIGINAL DRAWINGS, BY W. F. MITCHELL, ESQ.

WITH AN INTRODUCTION BY A NAVAL ARCHITECT.

1881.

PORTSMOUTH:

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The Royal Navy.

1872-80.

INTRODUCTION.

THE introductory remarks to the first volume of this set of lithographs, published in 1872, referred to ships produced at various periods between 1765, when the 'VICTORY' was launched, and the actual date of the publication.

The 'DEVASTATION' and 'THUNDERER' were included in that set, and it thus covered the great transition period in which sails were first aided and then displaced by steam in ships of war; that in which iron displaced wood as the material for their construction; and that, in which the required protection of the sides of the ships against the increasing power of the gun reached 12 inches of iron armour.

Important variations in the mode of mounting and protecting the heavy ordnance of the ships were illustrated in the the broadside ships and the turret ships; and an example was given of an unarmoured ship (INCONSTANT) reaching a speed of 16½ knots per hour. The lithographs in this second volume represent mainly ships designed and built within the last eight years.

Among the Ironclad ships the 'SHANNON,' 'TEMERAIRE' and 'INFLEXIBLE' represent entirely new types; and among the unarmoured ships the 'BOADICEA,' 'TURQUOISE,' 'WILD SWAN,' and 'FALCON,' are representatives of new classes designed and produced within this period. There is also an example of a ship of war (IRIS) of 18 knots speed, and of a Torpedo depôt ship (HECLA) of 12 knots speed accompanied by a Torpedo boat of 22 knots speed. Within this period the gun in the English Navy has increased in weight from 35 tons to 80 tons, and the work stored up in the projectile as it leaves the gun from 9000 foot-tons to 30,000 foot-tons. The energy of the shot leaving the muzzle of the 35-ton would lift 90 tons 100 feet, while that leaving the muzzle of the 80-ton gun in the 'INFLEXIBLE' would lift 300 tons 100 feet.

Within this period also the 'Whitehead Torpedo' has become an established weapon of warfare. This is a steel submarine boat of a speed of 22 knots per hour, carrying a charge capable of breaking in the bottom not only of any existing, but of any conceivable ship.

This deadly opponent may not only issue from the bow or from the sides of an enemy's ship, but it may be set in operation from each of a flotilla of boats of speeds greatly exceeding anything hitherto known in navigation. The Torpedo-boat has reached a condition in respect of propulsion which is, so far as can be seen at present, unattainable by the ship.

In ships of ordinary dimensions, and weight of hull and machinery the resistance to their passage through the water at their highest speeds grows so rapidly that in a ship of high power and well proportioned for a fifteen knot speed, the horse-power required to drive her at 15 knots per hour is twice that which is required to drive her at 12 knots per hour.

Where the form and proportions are less favourable to speed, and a fifteen knots speed is obtained with difficulty it will be sometimes found that it has required three times the power to get fifteen knots that was required to get twelve knots. If it were possible to increase the Engine power in such ships still further it is reasonable to expect that the law of increase in resistance would make further increments in speed equally costly in power. But the success with Torpedo boats shews that there is an attainable condition, in which the power becomes so great in proportion to the weight to be driven that the vessel then rises in the water, and is borne forward on a wave, which travels with her, at speeds which are easily increased. In this condition equal increments of power give nearly equal increments of speed: *i.e.* it requires scarcely any more increase of power to pass from 21 knots per hour to 22 knots, than it does to pass from 18 knots per hour to 19 knots.

Unfortunately the prospect of being able to obtain this condition in ships is distant. It is not usual to find Engines in sea-going ships of greater (numerical) power in indicated horses, than the (numerical) displacement tonnage of the ship; whereas in these torpedo boats the (numerical) power of the Engines is from 15 to 20 times the (numerical) displacement tonnage.

Still the fact remains, and there is much reason for hope in it, that Torpedo boats realising the above conditions, and getting a speed of 22 knots, are capable of steaming with their own fuel long distances at sea at moderate speed. The creation of these boats, due to Mr. THORNYCROFT, is one of the most remarkable events that has occurred in the history of steam navigation, we may almost say in the history of navigation itself, and the introduction of these boats into warfare has occurred since the issue of our first volume. Until the same success can be obtained with ships, the Torpedo boats will be most formidable assailants. They can issue from harbours at speeds far above that of ships, and can attack them with the torpedo. They can be carried in ships, and can, under the cover of darkness or smoke overtake and attack an enemy's ship: or they may form an auxiliary flotilla, working with the ships, but independently: drawing supplies from the ships, but capable of operating at great distances from them.

The whole conditions of Naval warfare are subject to great change in face of this new element of attack and defence. The tendency is manifestly to make home defence far more secure against naval attack, and to make organised warfare in fleets more and more perilous.

While this torpedo attack has been in process of development, the 'Mitrailleur' or Machine gun, which is to some extent an answer to it, has been developing. The 'Nordenfelt' and 'Hotchkiss' guns are so powerful an enemy to the Torpedo boats that they cannot continue to to float under their fire.

The use of the Electric light on the part of the defence and a good armament of Machine guns furnish the security against attack by night or day by torpedo boats. It is however open to doubt whether by force of numbers the guards of the ships may not be surely broken through by the Torpedo attack, at least at night. The Machine gun has become so powerful that it can send shells in streams through the sides of ordinary unarmoured ships.

The armoured ship of war in its modern form has had existence for not quite a quarter of a century. It has during this period called into existence guns of immense power for penetrating thick armour, so that two feet of solid iron armour is now perforable. It has strengthened its armour by a steel face so that only steel projectiles will successfully meet it. It is threatened by the torpedo, and it protects itself by minute internal subdivisions and by external steel wire nets.

It is threatened by the swift torpedo boat and it protects itself by the machine gun and the electric light, and by a cordon of floating torpedoes fired from within the ship. In the end the ship is enormously costly and is in greater peril of sudden and terrible disaster than ever. Already, therefore, there are signs that armour *on the sides* of the ships, to which they owe their distinctive position as Ironclads, is to be abandoned, and that their vital parts are to be protected by other means.

It has often been urged, as a fault, against successive Administrators of the Navy that they do not create homogeneous fleets; and against Naval designers, that they are incapable of producing a type of ship with promise of permanence in it. It appears to be considered that failure to produce such definite and permanent types as the sailing Line-of-battle ships and frigates must be due to some inability in the designer to measure properly the work to be done, and the means available for doing it.

What has been said will tend to shew that both the nature of the work to be done by the ship, and the means and material available to the designer are always making advances.

Speed is, for example, a most important condition in the design of a ship. So long as ships were propelled by sails the speeds attainable lay within very narrow limits, but with the introduction of steam it is difficult to see any limit to the speeds which may be realized.

Until recently the speeds of ocean-going merchant steamers have been moderate. Their average speeds on their voyages have hardly exceeded the speeds of good sailing ships in favouring winds. But there are signs of a great impending change in this respect. Already there are ships running across the Atlantic at average speeds for the passage of 16 to 17 knots per hour, and ships are building designed for still higher performance.

This can only be done by giving enormous size to the ships. They are heavier and have far more powerful engines than the 'INFLEXIBLE,' and they approach twice her length.

This change also must affect materially the type of ship required for the Royal Navy, since each of these passenger ships may become at short notice, a ship of war in the hands of an enemy.

Such then, in the year 1880, are the general conditions under which ships are produced for the Royal Navy.

Less than forty years ago every Line-of-battle ship was propelled by *sails only*. Twenty years ago England had 48 two and three decked wooden Line-of-battle ships without armour, which could be carried into action *by steam* at speeds varying between 10 and 15 statute miles an hour, and splendid ships they were. The introduction of steam had changed them, but had not impaired their beauty.

The 'MARLBOROUGH' and 'RENOWN' were even more magnificent works of art than the Line-of-battle ships of the olden time, of which the fighting 'TEMERAIRE' was a type. Speaking of these ships, and thinking probably of both types, Mr. RUSKIN said in 1856 in his "Harbours of England."

"For one thing this century will in after ages be considered to have done in a superb manner, "and one thing, I think, only. It has not distinguished itself in political spheres; still less in "artistical. It has produced no golden age by its Reason; neither does it appear eminent for the "constancy of its Faith. Its telescopes and telegraphs would be creditable to it, if it had not in "their pursuit forgotten in great part how to see clearly with its eyes, and to talk honestly with its "tongue. Its natural history might have been creditable to it also, if it could have conquered "its habit of considering natural history to be mainly the art of writing Latin names on white tickets. "But, as it is, none of these things will be hereafter considered to have been got on with by us "as well as might be; whereas it will always be said of us, with unabated reverence,

'THEY BUILT SHIPS OF THE LINE.'

"Take it all in all, a Ship of the Line is the most honourable thing that man, as a gregarious "animal, has ever produced. By himself, unhelped, he can do better things than ships of the line; he "can make poems and pictures, and other such concentrations of what is best in him. But as a being "living in flocks, and hammering out, with alternate strokes and mutual agreement, what is necessary

"for him in those flocks, to get or produce, the ship of the line is his first work. Into that he has "put as much of his human patience, common sense, forethought, experimental philosophy, self-"control, habits of order and obedience, thoroughly wrought handwork, defiance of brute elements, "careless courage, careful patriotism, and calm expectation of the judgment of God, as can well be "put into a space of 300 feet long by 80 broad. And I am thankful to have lived in an age when I "could see this thing so done."

It would be interesting to have Mr. RUSKIN's opinion of the 'DREADNOUGHT' and 'INFLEXIBLE' of to-day.

His sailing Line-of-battle ship weighed about 2000 tons, and was put together with ribs of oak, bound up in oak and elm and pine. The Line-of-battle ship of to-day weighs 11,000 tons; has ribs of iron and steel, is bound together with bonds of steel, wears an iron or steel cuirass weighing as much as an entire 'TEMERAIRE,' and fights with guns, each of which weighs as much as an entire main-deck of the guns of forty years ago. The sailing Line-of-battle ship could beat up against the wind, and win three or four knots an hour. The Line-of-battle ship of to-day will steam against the wind at from 12 to 14 knots per hour. The sailing ship could reverse her slow course in from 15 to 30 minutes. The line-of-battle ship of to-day reverses her course at full speed in two minutes. And the new day has brought against the ship, as we have seen, deadly enemies against which the older ships would have been helpless. The explosive shell tears the wooden sides into splinters, and drives the rending, burning fragments among the men and guns. The ram propelled by steam bears down with certainty upon the sluggish sailing ship, and rips open her staunchest wooden defences. The torpedo boat worked by four or five men lowered from the unseen, or rapidly passing ship, discharges against her a missile which bursts beneath her and wrecks her in a moment. Against such enemies the modern Line-of-battle ship has to be capable of defending herself more or less perfectly.

MR. MITCHELL has skilfully put into the modern ships which he has sketched for these illustrations such elements of beauty as the eye may still be able to trace in them, yet it is to be feared that they will be regarded as falling far short of the older ships in attractiveness of form.

But it is certainly as true of them in 1880 as it was in 1856, that into them has been put as much "human patience, common sense, forethought, experimental philosophy, self-control, habits of order and obedience, thoroughly wrought handwork, defiance of brute elements, careless courage, careful patriotism, and calm expectation of the judgment of God, as can well be put into a space of 300 feet long by 80 broad."

One of the ships given among these illustrations bearing the most honoured name, save one, in all the realm ('ALEXANDRA') built by the noisy labour of thousands of men, working in agreement for four years, on the banks of the Don, the Thames, and the Medway, has borne the

English flag first as leader of an English fleet in defiance of both Russia and Turkey, past the frowning batteries of the Dardanelles into the Sea of Marmora, and afterwards as leader of the fleets of Europe assembled in the Adriatic with the threat of War, but in the interests of Peace. Apart from her mission, and the gallant spirits who comprehend and fulfil it, she is but a dumb and helpless monster, with vast possibilities and some shapeliness. But steaming up that narrow channel into the Sea of Marmora in the midst of a blinding and deafening storm, ready at a word from one man to strike a blow on either side sufficient to lift at a 1000 yards distance, more than 1000 men 300 feet in the air, she appears to justify the generous and eloquent words of the great art critic. If she does, who shall deny that she is beautiful and that she bears her great name worthily.

Those best acquainted with the subject are not so satisfied with the constitution of the English Navy or so blind to the excellences of the Navies of other Powers as to be at all anxious to challenge comparison between them. Across the Atlantic there is however an active and intelligent Naval Bureau which finds leisure amidst the cares of administration, and interests itself in the relative strengths of European Navies. It publishes under official authority reports of individual officers who come to Europe with proper credentials, take notes and print them. So the European Powers see themselves as others see them. Two such reports are accessible, one by Chief-Engineer KING, of the United States Navy, and the other by Lieutenant VERY, both included in the reports by the Secretary to the Navy. They are both worth careful study by the two Powers chiefly compared, viz.: England and France. The former writer is rather too favourably impressed sometimes with that which is English; the latter with that which is French. The Engineer and and the Naval officer take opposite sides; the Engineer, perhaps unconsciously, has lost sight of much in the French navy which the Naval officer has noted admiringly. Happily for those who are responsible in France and in England the basis of some of the criticisms is inexact.

It may, perhaps, satisfy those who would like to have some statement as to the relative operations of the maritime powers in their State navies, and their apparent policies, if a quotation is given from a state document published by the French government last year. A commission was appointed by the French Chamber to consider the French Naval estimates for 1879. M. GAMBETTA, and M.M. JULES FERRY and ALBERT GREVY being President and Vice-Presidents respectively. They refer to the condition laid down in 1872 as the minimum for the fleet. According to that decision it ought to include among the armour-plated ships "16 vessels of the first class, 12 of the second, and 20 coast defence ships."

The armour-plated ship of the first class is defined to be a ship built of iron, with watertight compartments, armour plating 12 inches thick, deck plating $1\frac{1}{2}$ inches to 2 inches thick, a ram, and guns of $12\frac{3}{4}$ inches calibre. That of the second class is defined to be built of iron, with plates of $8\frac{3}{4}$ inches to 9 inches thick, and deck plated in all essential parts.

The coast defence vessels are said to be ships (they are seagoing) in which everything is subordinated to impenetrability of hull and power of artillery. The power of attack may be composed of two guns only, but they should be of the most powerful calibre; the defensive power, that is the protection, vertical or horizontal, of the ship, and her artillery should attain the maximum which has as yet been realised.

The Commission reported on these divisions as they actually existed, as follows :—

"The list of the fleet reckons as armour-plated ships of the first class 20 vessels. Of this number are the oldest of armoured vessels, the 'GLOIRE' and 12 others of the same force. They are of wood, without a spur, without watertight compartments, armoured with plates of 4 inches and 6 inches; carry guns of $9\frac{1}{2}$ inches; have been at sea for 12, 15, or 20 years, and will have disappeared in 1885. The other seven are the 'OCEAN,' 'MARENGO,' 'SUFFREN,' 'FRIEDLAND,' 'RICHELIEU,' 'COLBERT,' and the 'TRIDENT.'

"Excepting the 'FRIEDLAND,' they are of wood; three are armoured with plates of 8 inches, four of $8\frac{5}{8}$; their guns are of $10\frac{3}{4}$ inches. They are our strongest armoured ships in service. Not a ship in our active fleet fulfils the conditions required since 1872, for first class ships. These conditions are only to be found realised in four vessels, at present either under trial or in course of building, the 'REDOUTABLE,' armoured with $13\frac{3}{4}$-inch plates, the 'FOUDROYANT,' and the 'DEVASTATION,' with 15-inch plates, the 'ADMIRAL DUPERRE,' with $21\frac{1}{2}$-inch plates, all either of iron or steel, and of undoubted superiority to the preceding. It is proposed to commence, in 1879, two other armoured vessels, the 'FORMIDABLE' and the 'INFERNAL;' they will have plates of $21\frac{1}{2}$ inches, carry guns of 15 inches, 72 tons, and will be ready for service before 1885. The total of ships, at present finished or begun, which will then exist will be 13, and among them six conformable to the programme of 1872.

"There exist at the present time 10 ships of the second class; eight armour-plated, with armour of 4 inches, will have disappeared in 1885. There will remain two of them with plates of 6 inches, the 'GALISSONIÈRE' and the 'VICTORIEUSE.' Five are being tried or constructed, the 'TRIOMPHANTE' armour-plated with 6-inch plates, 'TURENNE,' 'BAYARD,' 'DUGUESCLIN,' and 'VAUBAN,' armoured with 10-inch plates, all of wood, excepting the two last. These five ships, added to the two vessels at present on service, will, in 1885, bring up the number of second class armour-plated vessels to seven.

"The fleet possesses 15 coast defence ships: seven old floating batteries, armour-plated with 4-inch plates, armed with guns of $7\frac{1}{2}$ and $6\frac{1}{4}$ inches, launched between 1864 and 1867, being reckoned merely as forming part of the sum. As much must be said of two coast defence ships, 'ONONDAGUA,' an armour-plated ship of $5\frac{1}{8}$-inch plates, and the 'TAUREAU' of 6-inch plates. There remain six ships, 'CERBERE,' 'BELIER,' 'TIGRE,' 'BOULE-DOGUE,' armour-plated of $8\frac{3}{4}$ inches,

and carrying guns of 9½ inches, and the 'TEMPETE' and 'TONNERRE,' armour-plated of 13 inches, and armed with guns of 10¾ inches. Six are on the stocks, 'TONNANT,' 'VENGEUR,' 'FULMINANT,' 'FURIEUX,' which carry an armour plating of 13 inches, and an artillery of 13½ inches, and the 'INDOMPTABLE' and 'TERRIBLE,' which will have an armour of 23½ inches, and very heavy artillery. Two others as powerfully armed, the 'REQUIN' and 'CAIMAN,' will be begun in 1879. In 1885 the number of ships at present finished or begun, which will still exist, will be 14, of which six do not fulfil the conditions settled in 1872.

Referring to unarmoured ships they say :—The construction of ships of war is so costly, their effectiveness so uncertain, and they are so certain not to last long, that the undertaking to create an armoured fleet seems fruitlessly to weary the perseverance of all nations. While giving up the method of fighting in squadron, a nation does not abdicate its naval power if it is able to produce, after assuring the defence of its coasts, ships provided with powerful engines, armed with heavy artillery, able to keep at sea for a length of time, and designed for running fights. Such is the rôle of cruisers. The programme of 1872 has fixed their number at 34, eight of the first class, eight of the second, and 18 of the third. Those of the first and second class should be of iron, coppered; those of the third alone may be of good wood. And the council of the Admiralty has indicated the most important quality of these ships, by saying, "their speed is to be superior, if possible, to the best types of foreign navies." The list of the fleet enumerates 44 of them. Of this number 21, at the present date, are aged from 15 to 26 years, and will have disappeared in 1885. There remain three cruisers of the first class, eight of the second, and 12 of the third.

Speaking of other Powers they say :—"Until the last few years there were only two naval Powers in Europe, and it was enough for France, in order to feel secure, to be at peace with *one* people, England. That people, exhausted by the immense effort by which it conquered us at the beginning of the century, was itself neglecting its fleet. We were under no necessity to rise to its level, it was descending to ours, and when war seemed possible, in 1840 and 1858, the cry of alarm of the English statesmen shewed that a kind of equality as respects naval power had taken place between the two countries. That contest, the only one which could have contained for us a formidable lesson, we were spared, and since then there remained more than enough naval force to France than was required as against Portugal, La Plata, Morocco, or the far East, and during half a century France has been able in both hemispheres to seek victory without finding a rival.

"This period has passed away. England has awakened from her slumber, and no one disputes the first rank with her. The second rank will not be our own without effort. Three nations, where greatness is the result of late events, have a seaboard, and that is not their last good fortune. They have boldly put forth their projects, and not to speak of anything besides fighting vessels, Russia has fixed her number at 12 armour-plated ships of the first class and 12 of the second. Germany and Italy at 16 armour-plated ships of the first class.

"These programmes are being carried out. Germany has advanced in the construction of her fleet with the disciplined tenacity which she brought to bear on the creation of her army. She has, in the first place, created ports, protected her coasts, (now guarded by guns of the greatest calibre,) and lastly has commenced a fleet which, without reaching the gigantic types developed elsewhere, reckons at the present date armour-plated ships of 16 inches. Russia has advanced more quickly in great constructions. She has in service these several years vessels such as the 'PETER THE GREAT' and the 'ADMIRAL POPOFF,' armour-plated from 14 inches to 16 inches. In 1876 her ardour extended to the artillery, and she entrusted a Russian factory with the construction of her 83-ton gun. Italy finally, the latest in the field, reveals by her first attempts the greatness of her ambition. She has determined to possess at one and the same time the most impenetrable ships and the most powerful artillery, and since 1873 she introduced the building of armoured ships of 24 inches, and ordered six guns* of 100 tons from Sir W. ARMSTRONG.

"At the present time she has finished the 'DUILIO,' which (as is the English 'INFLEXIBLE') is the most powerful engine of war as yet created by naval art. She is going on with the building of three ships of the same type, two of them of superior power, and being no longer inclined to pay tribute to foreigners for her artillery, she has cast her first 100-ton cannon at the arsenal of Turin.†

"Nor is the time far distant when the development of these Navies will become accomplished. Germany has fixed on 1882, Russia on 1883, Italy 1887; and if the necessity of the finances of war may retard the projects of the two last powers those of Germany are being carried out, and, according to all appearances, will be complete at the date fixed upon.

"To attain these results Germany devotes to her annual budget 75 millions, Italy 40, Russia 100. The budget of France is equal to that of these three powers together. It is only one quarter less than that of England."

It is very difficult to estimate the relative strength of the *unarmoured* parts of modern navies. It would be delusive to reckon only the ships built exclusively for war service, because on the outbreak of war, there would be an immediate increase in the strength of unarmoured navies by the incorporation of fast merchant ships. In these days of rifled guns of long ranges, and of torpedoes, maritime power for the purposes of war must be greatly affected by the amount of control possessed over ocean-going iron and steel steam ships of high speed. A weak power may, at short notice, possess herself of ships of this character. And in proportion as their speed exceeds what is usual among ships of commerce will be their importance in a

* This should be *eight* guns.

† Eight more 100-ton guns have been ordered abroad since the gun was cast at Turin.

contest with an enemy having a large mercantile marine. The regular ship of war is (apart from considerations as to speed and coal endurance) much the superior of the merchant ship, and whatever approximation time may bring about between them, the distinctive features of the man-of-war will probably continue to have much value.

The magnitude of the Consular Service is one of the most important conditions distinguishing the English navy from all others? This demands numbers of vessels comparatively inexpensive to build, to work, and to maintain. To provide proper training for seamen, and at the same time to economise fuel, sail power is largely developed in them, and much the greater part of their duty is performed under sail alone. This greatly increases the sea risks as compared with service under steam, yet there is but one case of the loss of one of these unarmoured ships during the last ten years, viz.: the 'NIOBE,' steam sloop, lost in 1874, off the Island of Miquelon.

There are certainly more than 150 such efficient sea-going ships, with large sail power, occupied mainly in consular service, and of these two-thirds are in constant employment. French steam cruisers are worked at higher speeds, and are less efficient as sailing ships. We learn therefore, on French authority, without surprise, that France consumes yearly for each ton of measurement of ships of war 22 fr: 60 cent: of coal, and England 14 fr: 10 cent:.

Fast merchant ships suitable for independent service in war are not at all numerous. Taking an average ocean speed of 12 knots an hour as being necessary for such service, it appears that there are, apart from the English mercantile marine, not more than 100 such ships built and building all over the world. Of these France has nearly half, and Germany one-fourth. A large proportion of these, like the bulk of the English ships, could not be prudently used for war purposes without considerable alterations.

The number of fast English ships is constantly increasing, and the attention of owners is largely directed to the desirability of making them more secure against the effects of collision, and the risks incidental to warfare. Ships complying with Admiralty conditions in this respect are put upon what is known as the Admiralty List. There are in process of building at this date in the United Kingdom in compliance with these conditions 63 ships, with an aggregate displacement tonnage of 480,000 tons. The mean or average displacement per ship is therefore over 7,500 tons. Some of them have as much as 13,000 tons displacement, and engines of 11,000 indicated horse power, with a length of 500 feet. The largest ironclad in the navy is quite small compared with them, as the illustrations will show.

The Ironclads are frequently spoken of as unwieldy ships, but as a matter of fact there are no ships in existence which can turn, stop, or reverse their courses so quickly as Ships of War.

This results necessarily from their comparative shortness and larger Engine power, the special facilities with which they are provided for stopping and reversing the machinery, and their large rudder power.

The provision made in them against vital injury by collision has no parallel in the merchant ship since it can only be made at great cost, in weight of material and in labour in building.

An Admiral who should attempt to manœuvre a fleet of Atlantic Liners as he would Ironclads, would probably, if he survived, present a heavy list of losses and casualties at the end of his cruize. Each, in its sphere, is the best thing that can be produced to meet the special conditions of its Service. The 'Germanic,' 'Gallia,' 'Arizona,' 'Servia,' 'Parisian,' and 'City of Rome,' for example, are as true representatives of the best which the Shipbuilders and Marine Engineers of these latter days can produce, as are the magnificent Ironclads of the European Navies.

December, 1880.

H.M.S. "INFLEXIBLE."

Built and completed for sea at Portsmouth Dockyard.

Launched April, 1876.

Is an Iron Armour-clad (Twin Screw) Steam Ship of 8000 Indicated Horse-power, and carries 4 guns viz, : four 16-inch 80-ton Muzzle Loading guns.

Her thickness of armour plating above water in the central parts of the ship varies between 24 inches and 16 inches. The armour on the Turrets is faced with steel.

		Ft.	In.
Length		320	0
Breadth		75	0
Load Draught of Water	forward	23	7
	aft	25	7
Displacement Tonnage		11500	
Speed (estimated)		14 knots.	

Carries a complement of 370 men, and is estimated to cost (up to the latest date) for Hull and Engines £700,000.

She was designed by the Department of the Controller of the Navy, and Engined by Messrs. J. Elder & Co., of Glasgow.

H.M.S. ALEXANDRA.

Published Dec.ber 1st 1880 by Geo. Rowney & Co. Rathbone Place London

H.M.S. "ALEXANDRA."

Built and completed for sea at Chatham Dockyard.

Launched in April, 1875.

Is an Iron Armour-clad (Twin Screw) Steam Ship of 8615 Indicated Horse-power, and carries 12 guns, viz. : two 11-inch 25-ton Muzzle Loading guns, and ten 10-inch 18-ton Muzzle Loading guns. Her thickness of armour plating above water in the central parts of the ship varies between 12 inches and 6 inches.

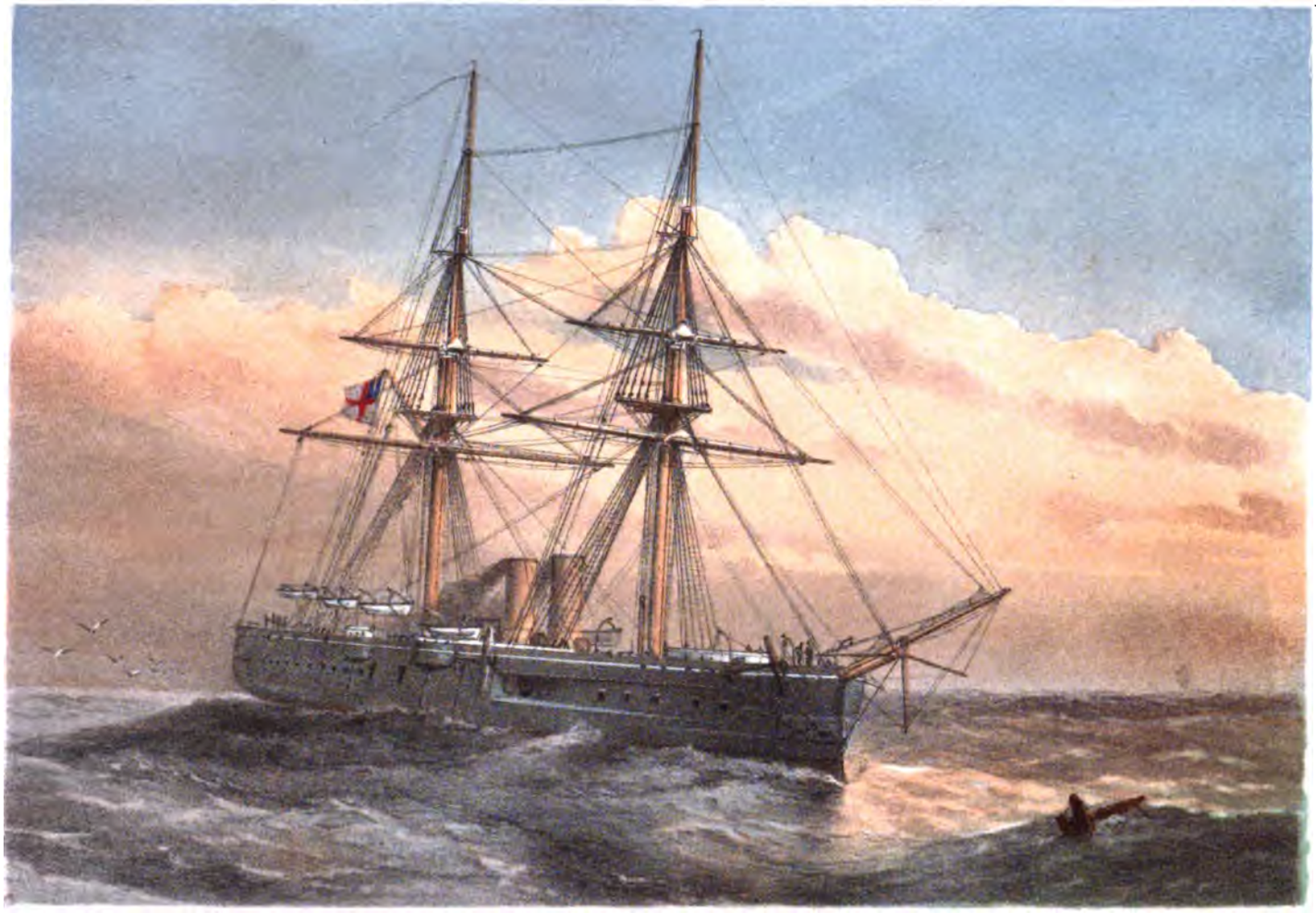
		Ft.	In.
Length	... ...	325	0
Breadth	... ...	63	8
Load draught of Water	forward ...	26	0
	aft ...	26	6
Displacement Tonnage		9492	
Speed (measured mile)		15 knots.	

Carries a complement of 666 men, and cost for Hull and Engines £516,000.

She was designed by the Department of the Controller of the Navy, and Engined by Messrs. Humphrys.

She was first commissioned on 22nd November, 1876, by Captain Robert O. B. Fitzroy, with Atwell B. Lake as Commander and James L. Hammet First-Lieutenant, and on 15th January, 1877, she hoisted the flag of Vice-Admiral G. T. Phipps Hornby, who afterwards received the honour of Knighthood with the order of K.C.B., for his services as Commander-in-Chief in the Mediterranean during the critical period of the Russo-Turkish War, 1877-79.

On 5th February, 1880, she hoisted the flag of Vice-Admiral Sir F. Beauchamp Seymour, K.C.B., (succeeding Admiral Hornby as Commander-in-Chief in the Mediterranean) with Lord Walter T. Kerr as Captain, Sacheverel C. Darwin Commander and John E. Blaxland First-Lieutenant.



H.M.S. TEMERAIRE.

Published Dec 1st 1880, by Griffin & Co Portsmouth

H.M.S. "TEMERAIRE."

Built and completed for sea at Chatham Dockyard.

Launched in May, 1876.

Is an Iron Armour-clad (Twin Screw) Steam Ship of 7700 Indicated Horse-power, and carries 8 guns, viz.: four 11-inch 25-ton Muzzle Loading guns and four 10-inch 18-ton Muzzle Loading guns.

Two of the 25-ton guns are mounted above the upper deck within armoured towers, within which they revolve, and rise and fall under the operation of hydraulic machinery. By means of this machinery they are also supplied with ammunition and loaded.

Her thickness of armour plating above water in the central parts of the ship varies between 11 inches and 8 inches.

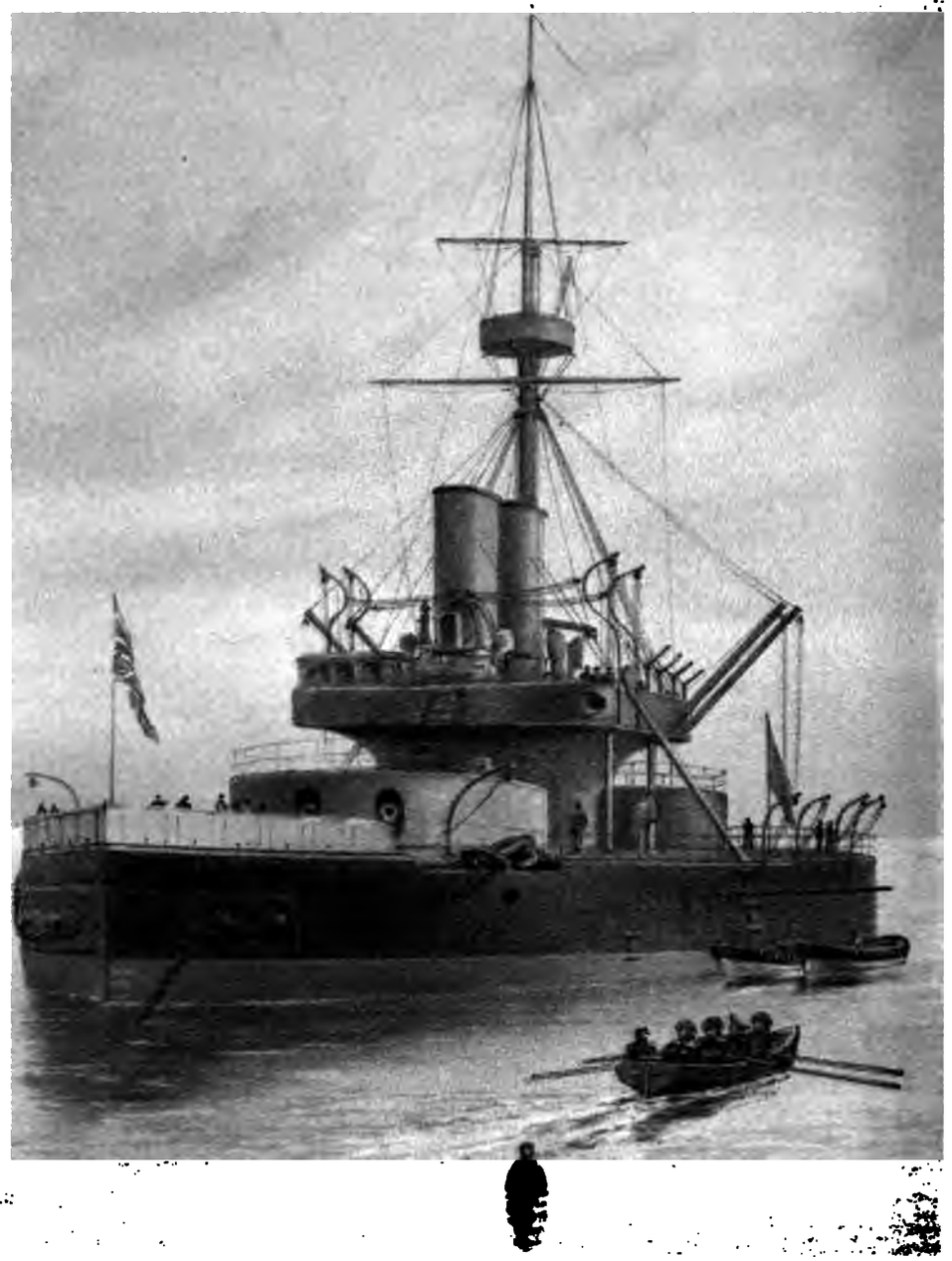
		Ft.	In.
Length	... ...	285	0
Breadth	... ...	62	0
Load Draught of Water	forward ...	26	8
	aft ...	27	2

Displacement Tonnage	8540
Speed (measured mile)	14·56 knots.

Carries a complement of 530 men, and cost for Hull and Engines £472,000.

She was designed by the Department of the Controller of the Navy, and Engined by Messrs. Humphrys.

She was first commissioned on the 8th July, 1877, by Captain M. Culme-Seymour, with Albert B. Jenkings as Commander and John R. E. Pattisson First-Lieutenant, succeeded by Captain the Hon. W. C. Carpenter, (5th March 1880), with Mr. A. B. Jenkings again as Commander and Duke A. Crofton First-Lieutenant.



H.M.S. DREADNOUGHT.

H.M.S. "DREADNOUGHT."

Built at Pembroke Dockyard, and completed for sea at Portsmouth.

Launched in March, 1875.

This ship was commenced under the name of "Fury," in 1870, but was subsequently re-designed for heavier armour and higher speed and re-named.

Is an Iron Armour-clad (Twin Screw) Steam Ship of 8000 Indicated Horse-power, and carries 4 guns, viz.: four 12½-inch 38-ton Muzzle Loading guns. Her thickness of armour plating above water in the central parts of the ship varies between 14 inches and 10 inches.

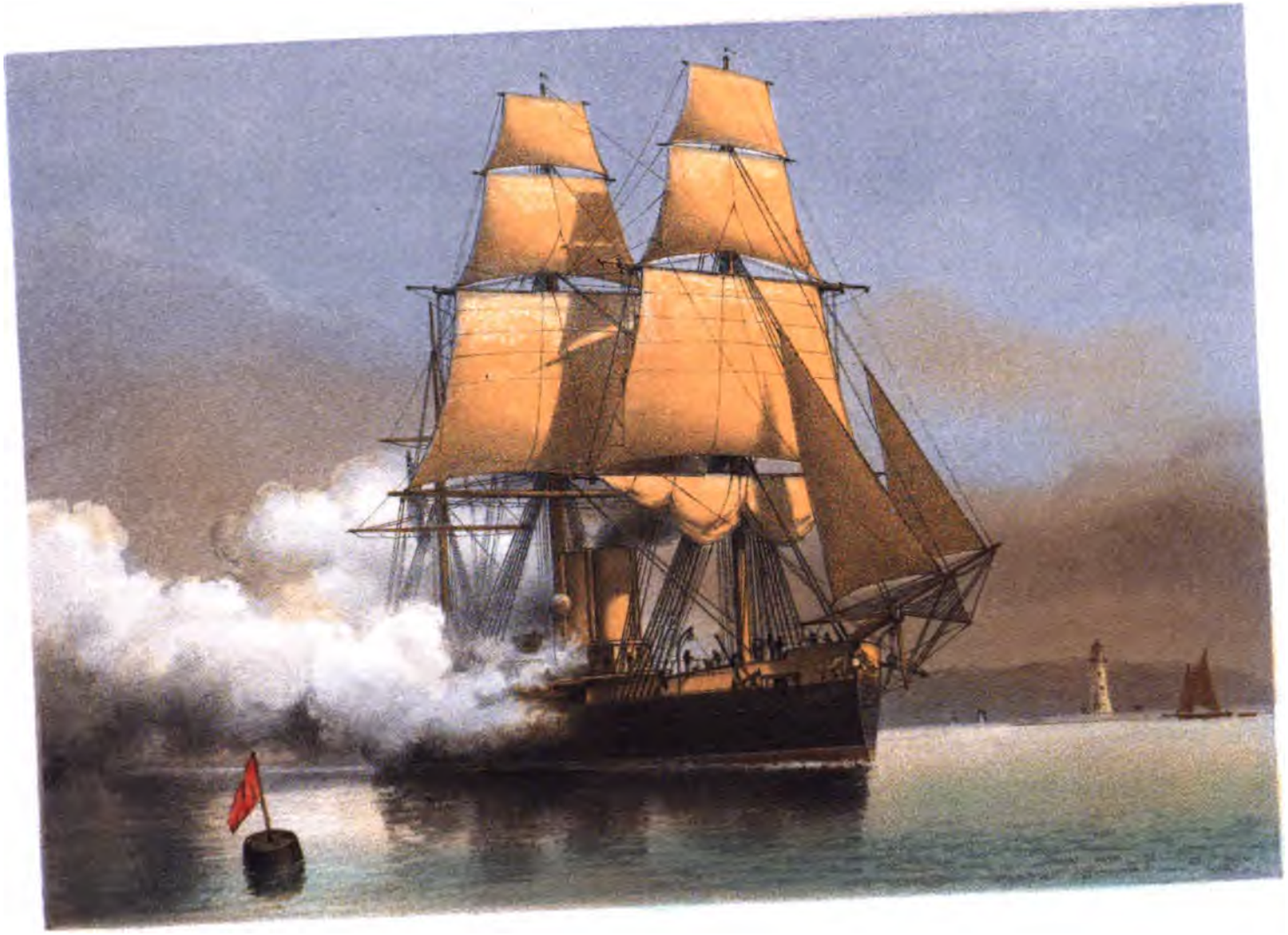
		Ft.	In.
Length	... ..	320	0
Breadth	... ...	63	10
Load Draught of Water	forward ...	26	3
	aft ...	26	9

Displacement Tonnage 10,886

Speed (measured mile) 14·52 knots.

Carries a complement of 369 men, and cost for Hull and Engines £610,000.

She was designed by the Department of the Controller of the Navy, and Engined by Messrs. Humphrys.



H.M.S. NEPTUNE.

Published Dec.ˢᵗ 1880 by Griffin & Cᵒ Portsmouth

H.M.S. "NEPTUNE."

Built and completed for sea for the Brazilian Government as the "Independencia." Purchased by the British Government in 1878, and altered in armament, &c.

Is an Iron Armour-clad (Single Screw) Steam Ship of 9000 Indicated Horse-power, and carries 6 guns, viz.: four 12½-inch 38-ton Muzzle Loading guns in Turrets, and two 9-inch 12-ton Muzzle Loading guns.

Her thickness of armour plating above water varies in the central parts of the ship between 13 and 8 inches.

		Ft.	In.
Length	... ...	300	0
Breadth	... ...	63	0
Load Draught of Water	forward	25	0
	aft	25	0

Displacement Tonnage	9000
Speed (measured mile)	14·216 knots.

Carries a complement of 540 men, and cost with armament and stores complete £600,000, but apart from alterations and additions.

She was designed by E. J. Reed, Esq., C.B., M.P., built by Messrs. Dudgeon, and completed for sea, for the Brazilian Government, by Messrs. Samuda; Engined by Messrs. John Penn & Sons.

H.M.S. SHANNON.

Published Dec 1st 1830, by Griffin & Co Portsmouth.

H.M.S. "SHANNON."

Built at Pembroke Dockyard, and completed for sea at Devonport.

Launched in November 1875.

Is an Iron Armour-clad (Single Screw) Steam Ship of 3370 Indicated Horse-power, and carries 9 guns, viz. : two 10-inch Muzzle Loading guns of 18 tons, and seven 9-inch Muzzle Loading guns of 12 tons.

Her thickness of armour plating above water in the central parts of the ship varies between 9 inches and 7 inches.

		Ft.	In.
Length	... ...	260	0
Breadth	... ...	54	0
Load Draught of Water	forward	20	10
	aft	23	4

Displacement Tonnage	5439
Speed (measured mile)	12·348 knots.

Carries a complement of 430 men, and cost for Hull and Engines £287,000.

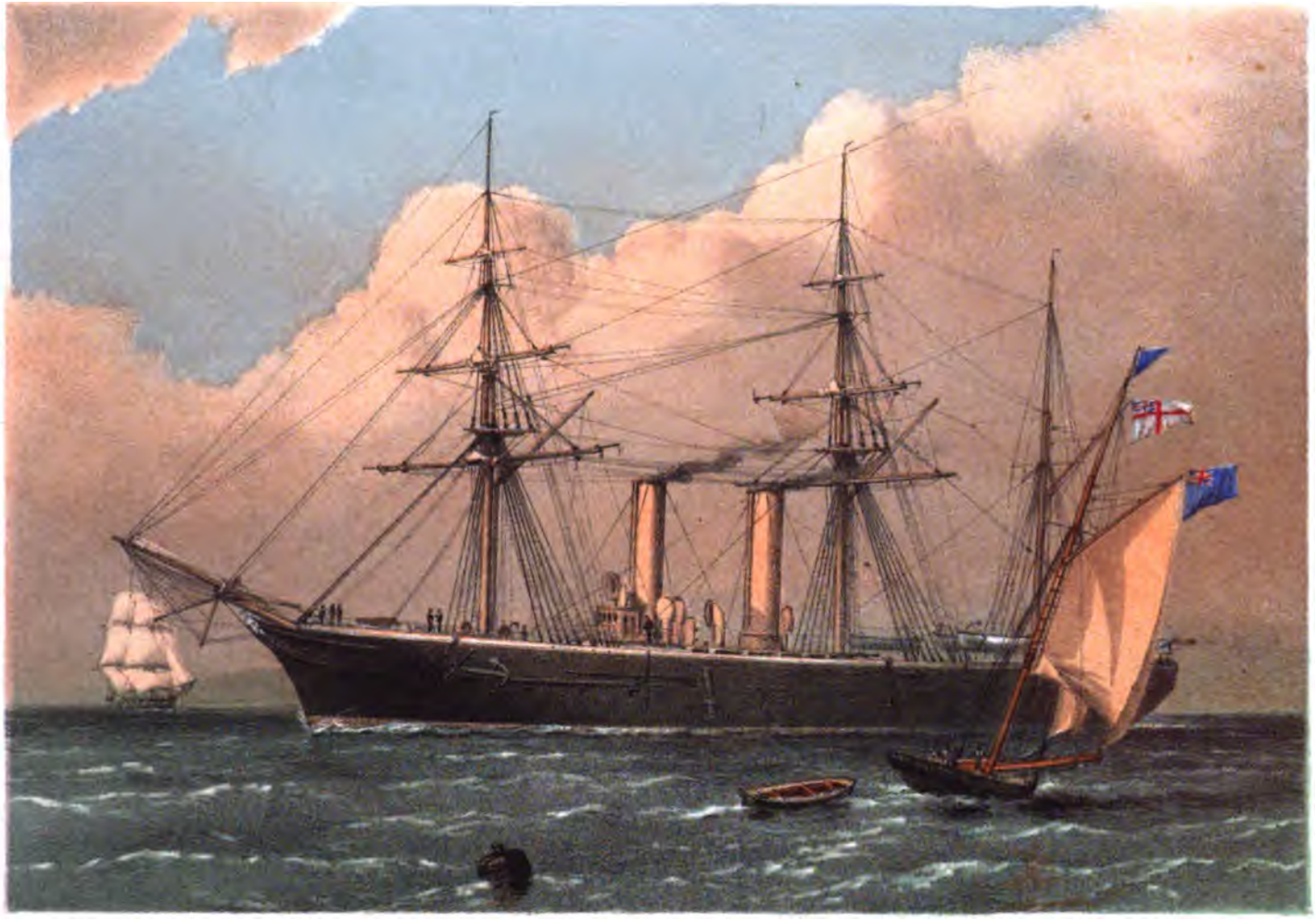
She was designed by the Department of the Controller of the Navy, and Engined by Messrs. Laird.

She was first commissioned on 17th July, 1877, by Captain William B. Grant, with Alexander G. McKechnie as Commander, and Edward A. Holbech First-Lieutenant, for service with the Channel Squadron, then acting with Admiral Sir G. Phipps Hornby in the Mediterranean, but was soon afterwards ordered to China, and from thence to the Pacific.

On 22nd July, 1879, Captain John D'Arcy was appointed Captain, with the same Commander and First-Lieutenant.

H.M.S. IRIS.

Published Dec.1st 1880, by Griffin & Co. Portsmouth.



H.M.S. IRIS.

Published Dec 1st 1880, by Griffin & Co Portsmouth.

H.M.S. "IRIS."

Built at Pembroke Dockyard, and fitted for sea at Portsmouth.

Launched in April, 1877.

She is an armed Dispatch vessel (Twin Screw) built entirely of steel (Siemens) and is unsheathed. She has a double bottom and is built in many compartments. She has Engines of 7330 Indicated Horse-Power, and is armed with ten 64-pr. Muzzle Loading guns.

		Ft.	In.
Length	... ...	300	0
Breadth	... ...	46	0
Load Draught of Water	forward ...	17	6
	aft ...	22	0

Displacement Tonnage	3735
Speed (measured mile)	18 knots.

Carries a complement of 250 men, and cost for Hull and Engines about £200,000.

The 'Mercury' differs from the 'Iris' in having an upright stem, and a different arrangement of head sail; with this exception, the ships are alike.

These ships were designed by the Department of the Controller of the Navy, and the Engines were built by Messrs. Maudslay.

Commissioned 27th April, 1880, by Captain Edward H. Seymour, with Lieutenant Robert H. Archer First-Lieutenant, and on appointment of the latter to the Royal Yacht, he was succeeded by Alexander Cook, 27th September, 1880.

H.M.S. SHAH, & CHILLIAN SHIP "HUASCAR"

Published Dec 1st 1880, by Griffin & Co Portsmouth.

H.M.S. "SHAH."

Built and fitted for sea at Portsmouth. She was originally intended to be named Blonde, but was launched in September, 1873, as the 'Shah,' in compliment to the present Shah of Persia.

She is a (Single Screw) Cruiser, 1st class, built of iron, sheathed and coppered, she has engines of 7477 Indicated Horse-power, and she carries 26 guns, viz.: two 9-in. 12-ton Muzzle Loading guns (Revolving), sixteen 7-in. 6½-ton Muzzle Loading guns, and eight 64-prs. Muzzle Loading guns of 71-cwt.

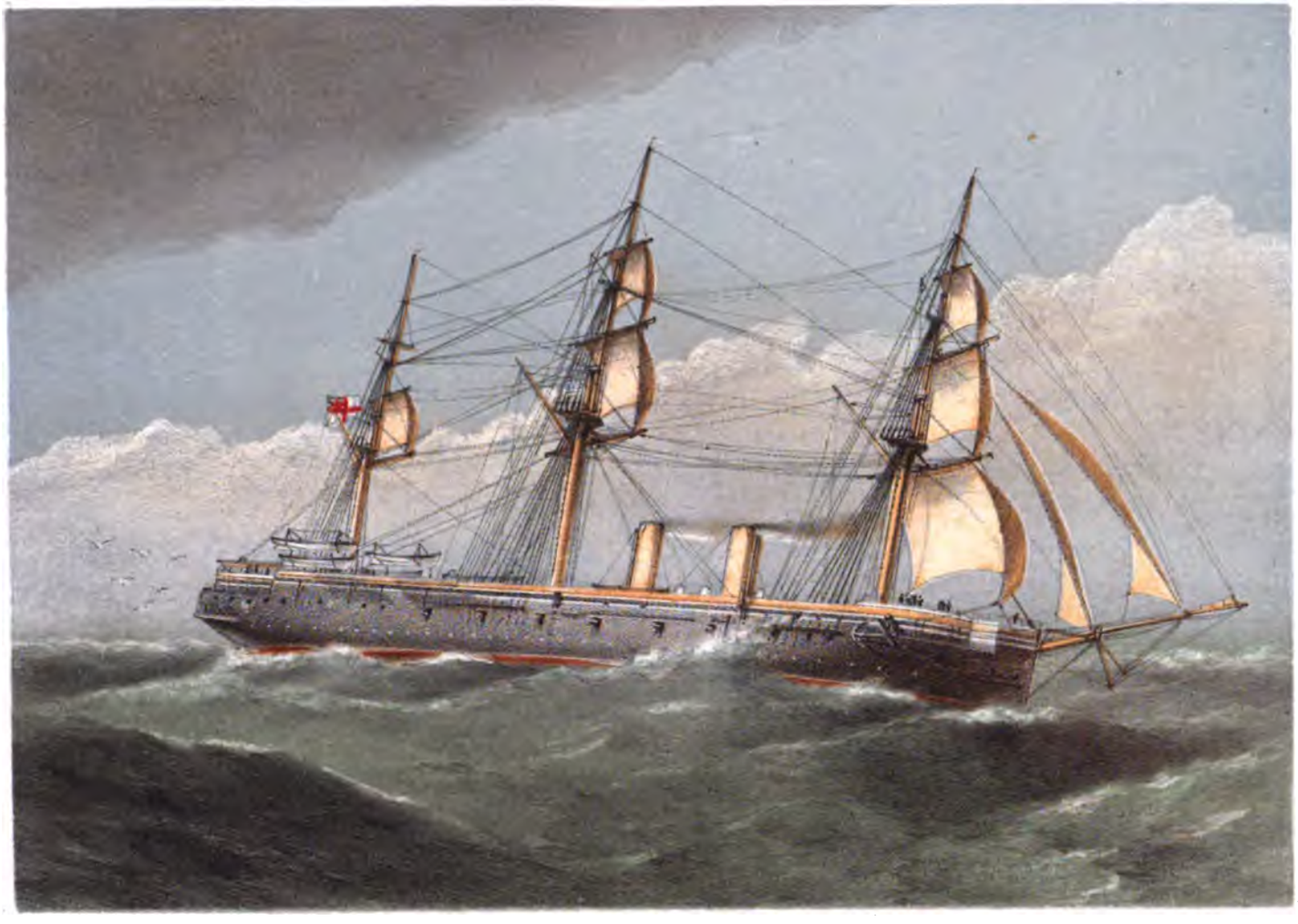
		Ft.	In.
Length	... ...	334	8
Breadth	... ...	52	0
Load Draught of Water	forward ...	22	3
	aft ...	26	8
Displacement Tonnage		6250	
Speed (measured mile)		16·45 knots.	

Carries a complement of 600 men, and cost for Hull and Engines £235,000.

This Ship was designed by the Department of the Controller of the Navy, and her engines were built by Messrs. Ravenhill.

She was commissioned on the 14th of August, 1876, to relieve H.M.S. 'Repulse,' carrying the flag of Rear-Admiral Algernon F. R. de Horsey on the Pacific Station, with F. G. D Bedford as Captain; Henry Rose, Commander, and George H. Rainier, First Lieutenant.

During the commission she engaged and disabled the Peruvian Monitor 'Huascar,' and was shortly afterwards relieved by H.M.S. 'Triumph,' Captain Bedford remaining with the latter ship. The 'Shah' was commanded on her homeward voyage by Captain Richard Bradshaw, who, on arrival at Madeira, hearing of the disaster at Isandula, returned to the Cape, carrying with him all the available fighting men on the island, and in subsequent shore operations against the Zulus, the 'Shah's' brigade did most timely and distinguished service.



H.M.S. RALEIGH.

Published Dec 1st 1880. by Griffin & Co Portsmouth

H.M.S. "RALEIGH."

Built and fitted for sea at Chatham.

Launched in March, 1873.

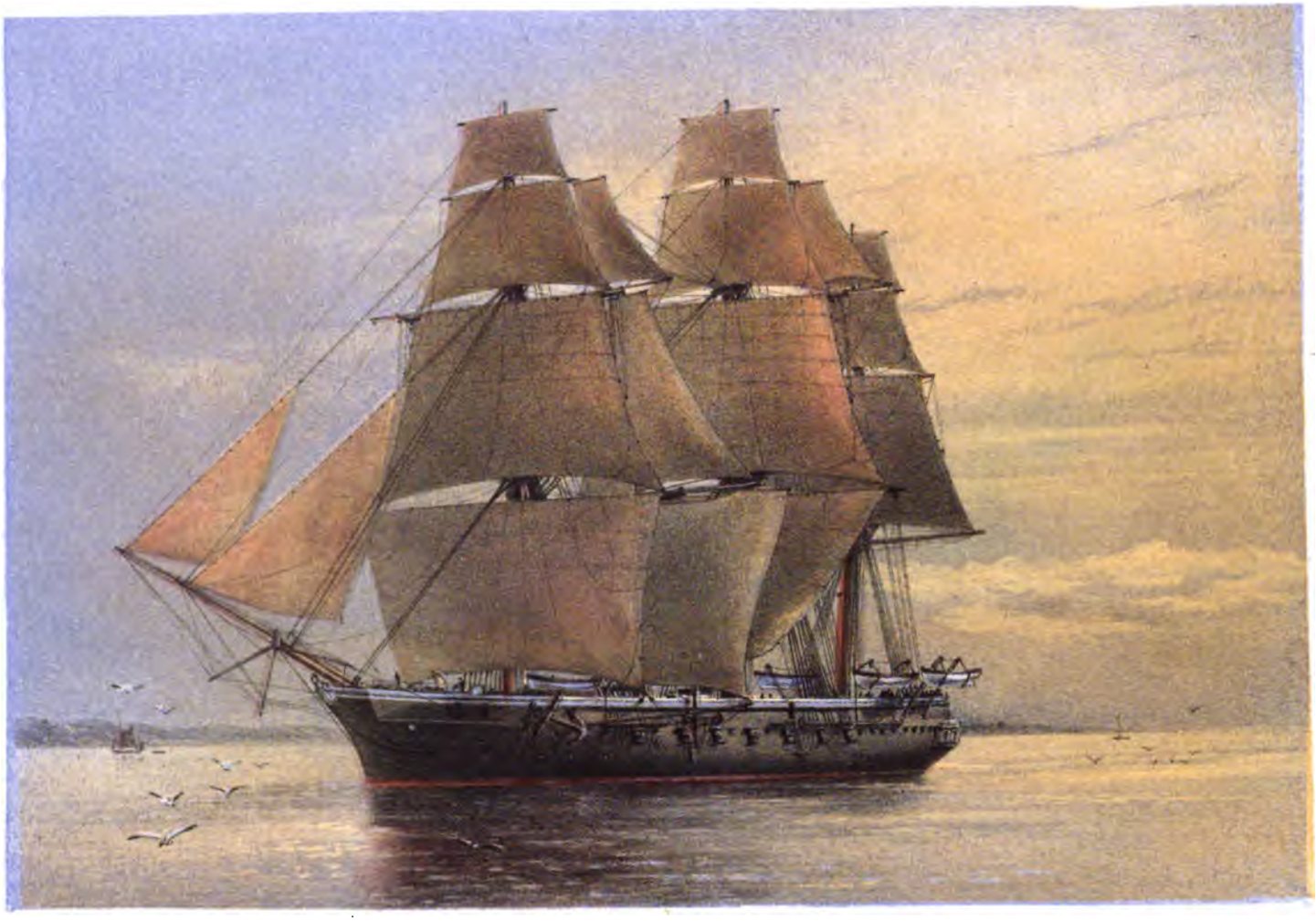
She is a (Single Screw) Cruiser 1st class, built of iron, sheathed and coppered. She has Engines of 6158 Indicated Horse-power and carries 22 guns, viz. : two 9-in. 12-ton Muzzle Loading guns (revolving), fourteen 7-in. 90-cwt. Muzzle Loading guns, and six 64-prs. Muzzle Loading guns.

		Ft.	In.
Length	... ...	298	0
Breadth	... ...	49	0
Load Draught of Water	forward ...	21	10
	aft ...	24	7
Displacement Tonnage		5200	
Speed (measured mile)		15·5 knots.	

Carries a complement of 550 men, and cost for Hull and Engines £193,000.

This Ship was designed by the Department of the Controller of the Navy, and her Engines were built by Messrs. Humphrys.

Commissioned 3rd December, 1873, by Captain George Tryon, C.B., with Arthur K. Wilson as Commander, and William H. Jocelyn, First-Lieutenant; succeeded 11th May, 1877, by Captain Charles Trelawny Jago, with Day H. Bosanquet Commander, and Anthony Kingscote First Lieutenant. She did duty with the squadron under Admiral G. Phipps Hornby during the Russo-Turkish War, afterwards taking new crew to H.M.S. "Wolverene" on Australian station.



H.M.S. BOADICEA.

Published Dec. 1st 1880 by Griffin & Co Portsmouth.

H.M.S. "BOADICEA."

Built and fitted for sea at Portsmouth. Launched in October, 1875.

She is a (Single Screw) Cruiser of the 1st class, built of iron, sheathed and coppered. She has Engines of 5130 Indicated Horse-Power, and is armed with 16 guns, viz. : fourteen 7-in. Muzzle Loading guns of 90 cwt., and two 64-prs. of 71-cwt.

		Ft.	In.
Length	... ...	280	0
Breadth	... ...	45	0
Load Draught of Water	forward ...	21	0
	aft ...	23	8
Displacement Tonnage		4140	
Speed (measured mile)		14·89	knots.

Carries a complement of 375 men, and cost for Hull and Engines £224,000.

This ship was designed by the Department of the Controller of the Navy, and her Engines were built by Messrs. Rennie.

Commissioned on 18th April, 1878, for particular service by Captain James E. Erskine, with Francis Romilly Commander, and John Masterman First-Lieutenant.

On the appointment of Captain F. W. Richards as Commodore on Cape of Good Hope and West Coast of Africa Station, she was selected to carry his flag, which was hoisted on 31st October, 1878. Captain Erskine being then appointed to the command of H.M.S. 'Garnet' as Senior Officer on South-East Coast of America Station.

H.M.S. BACCHANTE.

Published Dec 1st 1880, by Griffin & Co Portsmouth

H.M.S. "BACCHANTE."

Built and fitted for sea at Portsmouth. Launched in October, 1876.

She is a (Single Screw) Cruiser of the 1st Class, built of iron, sheathed with wood and coated with zinc instead of copper. She has Engines of 5420 Indicated Horse-Power, and is armed with 16 guns, viz.: fourteen 7-in. Muzzle Loading guns of 90-cwt. and two 64-prs. of 71-cwt.

		Ft.	In.
Length		280	0
Breadth		45	6
Load Draught of Water	forward ...	21	0
	aft ...	23	5
Displacement Tonnage		4130	
Speed (measured mile)		15·06 knots.	

Carries a complement of 387 men, and cost for Hull and Engines £229,000

The 'Euryalus' is sister ship to the 'Bacchante,' and cost for Hull and Engines £209,000.

These ships were designed by the Department of the Controller of the Navy, and were Engined as follows: those of the 'Bacchante' were built by Messrs. Rennie, and those of the 'Euryalus' by Messrs. Easton and Anderson.

Commissioned on 15th July, 1879, by Captain the Right Hon. Lord Charles T. M. D. Scott, with George W. Hill, Commander, and the Hon. Assheton G. Curzon-Howe, First-Lieutenant. On 4th August, the Royal Princes Albert Victor, and George of Wales joined her as midshipmen, and she afterwards proceeded for a six months' cruize to the West India islands, and on her return was attached to the Flying Squadron under Rear-Admiral the Right Hon. Earl Clanwilliam, C.B.

H.M.S. ACTIVE.

Published Dec 1st 1880, by Griffin & Co Portsmouth.

H.M.S. ACTIVE.

Published Dec 1st 1880, by Griffin & Co Portsmouth.

H.M.S. "ACTIVE."

Built at the Thames Iron Works, Blackwall, and fitted for sea at Portsmouth.

Launched in March, 1869.

She is a (Single Screw) Cruiser 2nd Class, built of iron, sheathed and coppered. She has Engines of 4015 Indicated Horse-power, and is to be armed with eighteen 64-pr. Muzzle Loading guns of 64-cwt.

		Ft.	In.
Length	... ...	270	0
Breadth	. ...	42	0
Load Draught of Water	forward ...	16	10
	aft ...	21	4
Displacement Tonnage		3080	
Speed (measured mile)		14·97	knots.

Carries a complement of 346 men, and cost for Hull and Engines £126,000

The 'Volage' is sister ship to the 'Active.'

These ships were designed by the Department of the Controller of the Navy, and were Engined as follows: those of the 'Active' were built by Messrs. Humphrys, and those of the 'Volage' by Messrs. Penn.

In October, 1873 she was selected to carry the flag of Commodore N. W. Hewett, V.C., who on the wounding of Commodore Commerell and subsequent outbreak of the Ashantee War, was appointed to the command on Cape and West Coast of Africa station, and for his services during the campaign (which included a distinguished part in the operations on shore) was rewarded with the honour of knighthood, and the order of K.C.B.

Returning home after the expiry of this commission she was again selected for the same station, to carry the flag of Commodore F .W. Sullivan, C.B. during the Zulu Campaign, for his services in which Captain Sullivan was awarded the honour of Knighthood, with the order of K.C.B. and C.M.G.

H.M.S. COMUS.

Published Dec.1st 1880 by Griffin & Co Portsmouth.

H.M.S. "COMUS."

Built by Messrs J. Elder & Co., of Glasgow, and fitted for sea at Sheerness.

Launched in April, 1878.

She is a (Single Screw) protected Cruiser of the 3rd Class, built with iron frames and steel plating, and is sheathed with wood and coppered. She has Engines of 2300 Indicated Horse Power, and is armed with 14 guns, viz.: two 7-in. Muzzle Loading guns and twelve 64-pr. Muzzle Loading guns.

She has an under water steel deck protecting machinery, &c.

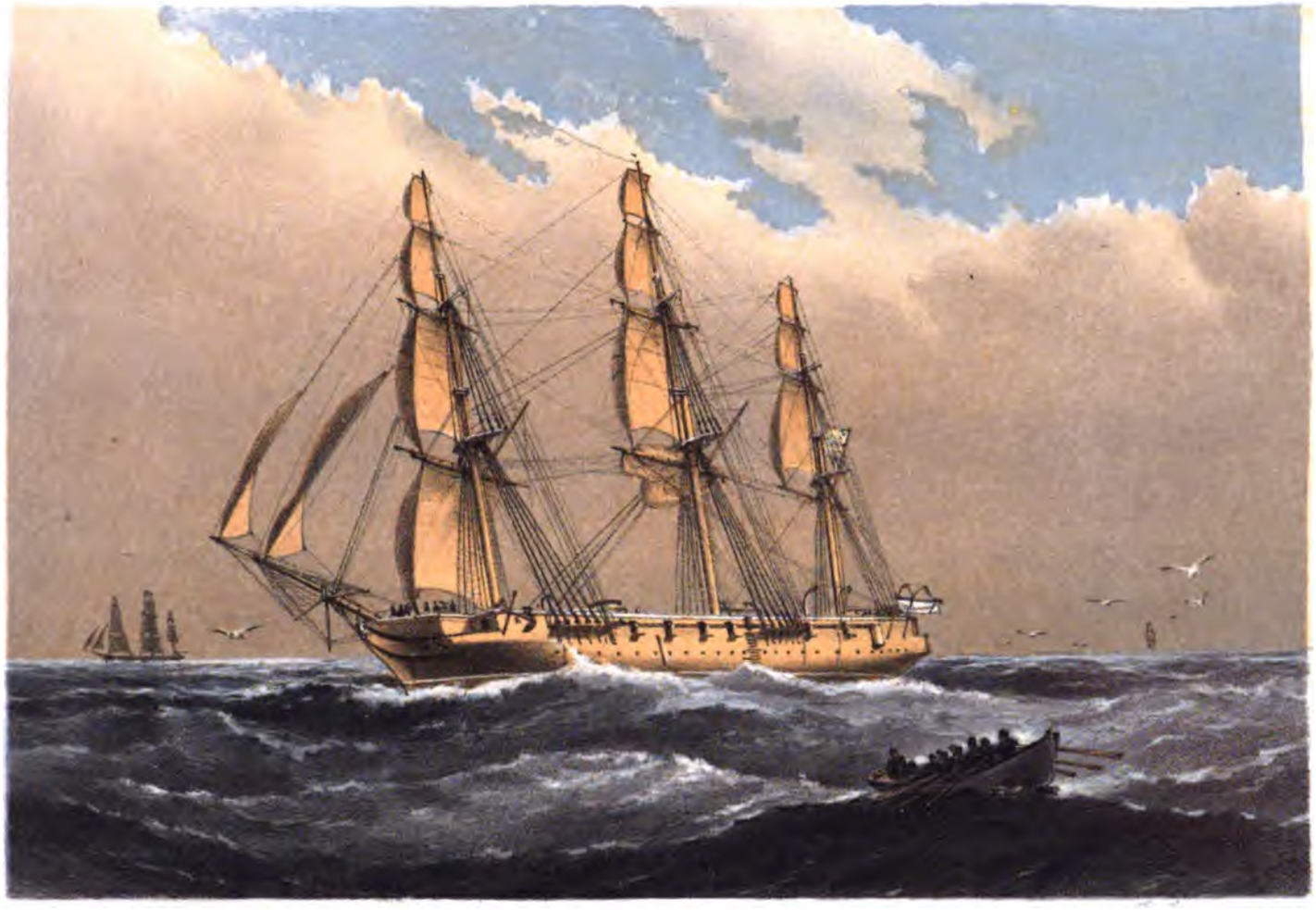
		Ft.	In.
Length		225	0
Breadth		44	6
Load Draught of Water	forward ...	16	9
	aft ...	18	10
Displacement Tonnage		2380	
Speed (measured mile)		13 knots.	

Carries a complement of 250 men, and cost for Hull and Engines £114,000.

The 'Champion,' 'Carysfort,' 'Cleopatra,' 'Curacoa,' 'Conquest,' 'Constance,' 'Canada,' and 'Cordelia' are sister vessels.

These ships were designed by the Department of the Controller of the Navy, and Engined as follows: those of 'Comus,' 'Champion,' and 'Carysfort' were built by Messrs. J. Elder & Co.; the 'Cleopatra,' 'Curacoa,' and 'Conquest' by Messrs. Humphrys; the 'Constance' by Messrs. Penn; and the 'Canada' and 'Cordelia,' by Messrs. Rennie.

Commissioned 23rd October, 1879, by Captain James W. East, with George Neville as First-Lieutenant, for service on the China Station.



H.M.S. DIAMOND.

Published Dec.1st 1880, by Griffin & Co Portsmouth.

H.M.S. "DIAMOND."

Built and fitted for sea at Sheerness. Launched September, 1874.

She is a (Single Screw) Cruiser of the 3rd Class, built of wood and coppered. She has Engines of 2155 Indicated Horse-power, and she is armed with fourteen 64-pr. Muzzle Loading guns of 64 cwt.

		Ft.	In.
Length	... ...	220	0
Breadth	... ...	37	0
Load Draught of Water	forward ...	14	10
	aft ...	17	6
Displacement Tonnage		1970	
Speed (measured mile)		13 knots.	

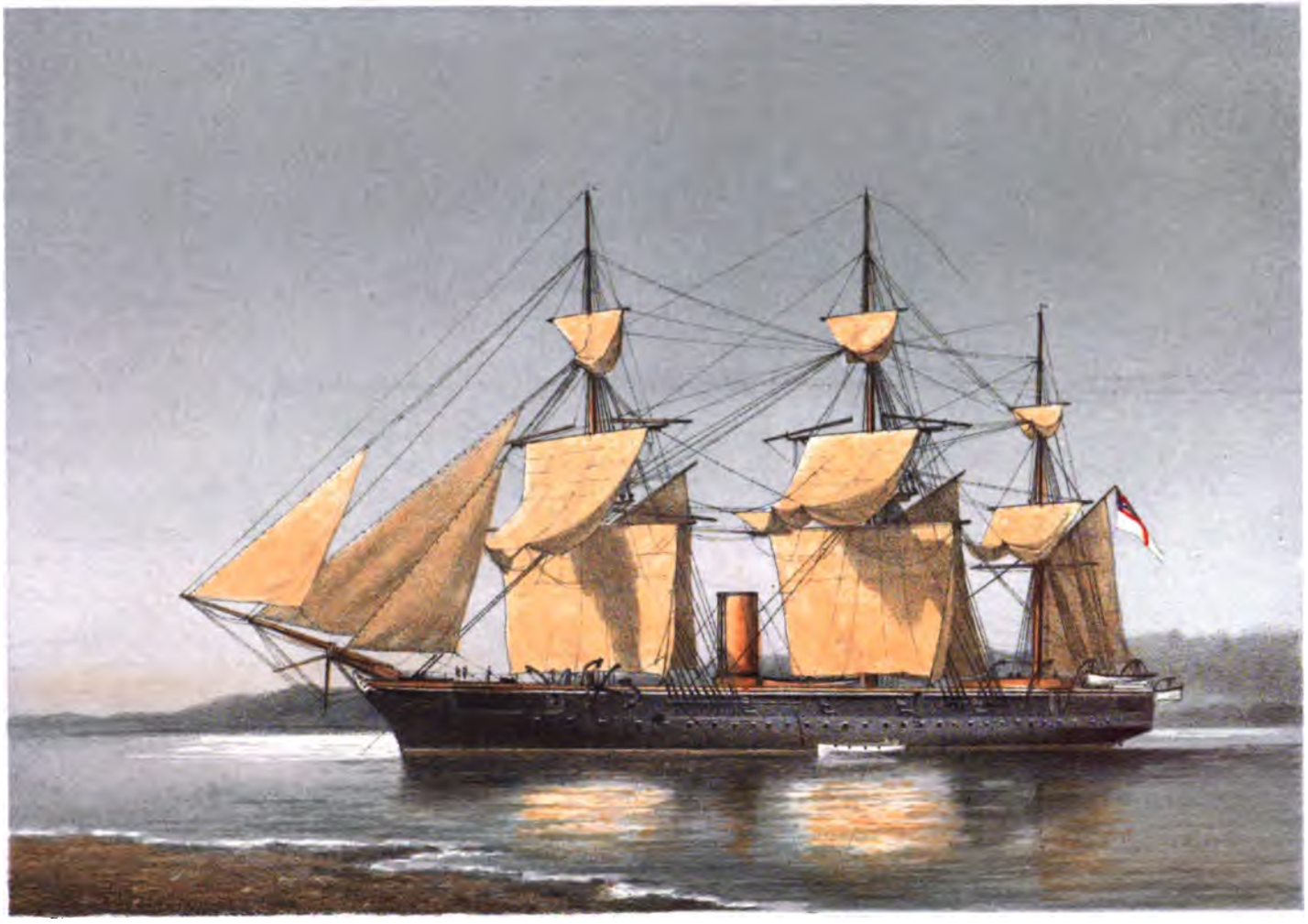
Carries a complement of 225 men and cost for Hull and Engines £77,000.

The 'Amethyst,' 'Encounter,' 'Modeste' and 'Sapphire' are sister vessels but there are small differences among them in the form of the head and disposition of the head sails.

These vessels were designed by the Department of the Controller of the Navy, and were Engined as follows: those of the 'Diamond' and 'Sapphire' were built by Messrs. Hawthorn; 'Encounter' and 'Amethyst' by Messrs. Rennie; and 'Modeste' by Messrs. Napier.

Was commissioned on 13th July, 1875 by Captain George S. Bosanquet, with Baldwin W. Walker First-Lieutenant, who, on his promotion to rank of Commander, was succeeded by Lieutenant A. C. Carew.

She was paid off in early part of 1879.



H.M.S. TURQUOISE.

Published Dec 1st 1880 by Griffin & Co Portsmouth.

H.M.S. "TURQUOISE."

Built by Earle's Ship-building Company, at Hull, and fitted for sea at Sheerness.

Launched in April, 1876.

She is a (Single Screw) Cruiser of the 3rd class, with iron frames and wood planking, copper sheathed. She has Engines of 1990 Indicated Horse-Power, and is armed with twelve 64-pr. Muzzle Loading guns of 64-cwt.

		Ft.	In.
Length		220	0
Breadth		40	0
Load Draught of Water	forward ...	16	6
	aft ...	18	6

Displacement Tonnage	2120
Speed (measured mile)	13 knots.

Carries a complement of 230 men, and cost for Hull and Engines £95,500.

The 'Emerald,' 'Garnet,' 'Opal,' 'Ruby,' and 'Tourmaline' are sister vessels.

These vessels were designed by the Department of the Controller of the Navy, and were Engined as follows: those of 'Turquoise' and 'Ruby' were built by Earle's Ship-building Co.; 'Tourmaline' and 'Garnet' by Messrs. Hawthorn; 'Opal' by Messrs. Napier; and 'Emerald' by Messrs. Thompson.

Commissioned 13th September, 1877, by Captain George Robinson for service in the Pacific, succeeded 10th December, 1879, by Mervyn B. Medlycott, Charles T. Turner being First-Lieutenant from the commencement of the commission.

H.M.S. WILD SWAN.

Published Dec 1st 1880, by Griffin & Co Portsmouth

H.M.S. "WILD SWAN."

Built by Messrs. Napier at Glasgow, and fitted for sea at Devonport.

Launched in January, 1876.

She is a (Single Screw) Sloop of War, with iron frames, sheathed with wood, and coppered. She has Engines of 800 Indicated Horse-power, and she is armed with 6 guns,: two Muzzle Loading guns of 90-cwt. and four Muzzle Loading 64-prs.

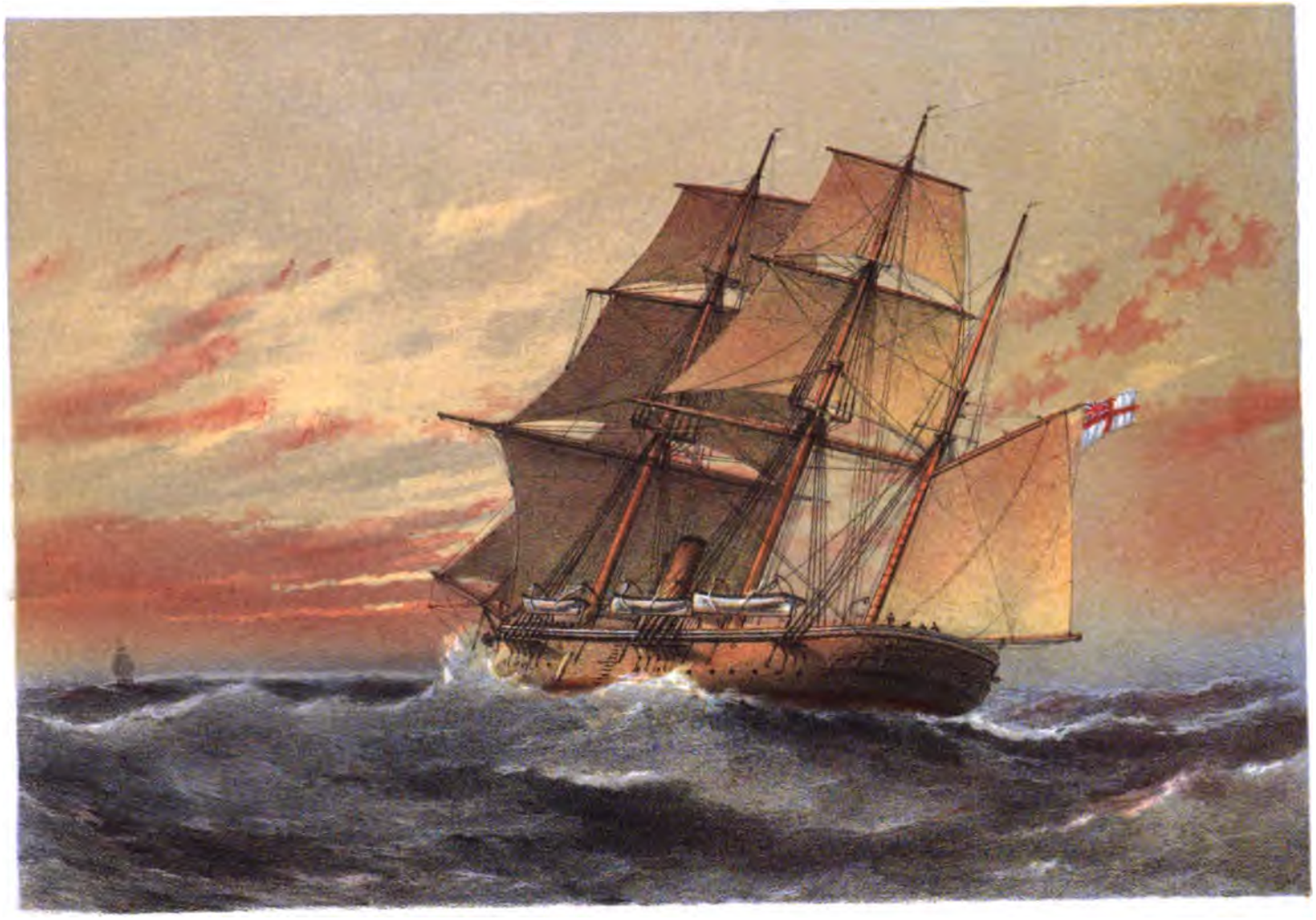
		Ft.	In.
Length	... ...	170	0
Breadth	... ...	36	0
Load draught of Water	forward ...	13	6
	aft ...	15	10
Displacement Tonnage		1130	
Speed (measured mile)		10½ knots.	

Carries a complement of 140 men, and cost for Hull and Engines £51,500.

The 'Cormorant,' 'Dragon,' 'Doterel' 'Gannet,' 'Kingfisher,' 'Miranda,' 'Osprey,' 'Pegasus,' 'Pelican,' 'Penguin,' 'Phœnix,' 'Mutine,' and 'Espiegle' are sister vessels.

These ships were designed by the Department of the Controller of the Navy, and Engined as follows, those of the 'Wild Swan' and 'Penguin' were built by Messrs Hawthorn; those of the 'Espiegle,' 'Mutine,' 'Kingfisher,' 'Doterel' and 'Dragon' by Messrs. Maudslay; those of the 'Phœnix,' 'Pelican,' 'Osprey,' 'Gannet,' and 'Cormorant' by Messrs. Humphrys; those of the 'Pegasus' by Messrs. Laird; and those of the 'Miranda' by Messrs. Napier.

Was commissioned 23rd August, 1877, by Commander Armand T. Powlett, who was succeeded in June, 1878 by Commander Seymour H. P. Dacres.



H.M.S. FALCON.

Published Dec. 1st 1880 by Griffin & Co Portsmouth.

H.M.S. "FALCON."

Built by Messrs. Laird, at Birkenhead, and fitted for sea at Devonport.

Launched in January, 1877.

She is a (Single Screw) Gun Vessel, with iron frames, sheathed with wood and coppered. She has Engines of 720 Indicated Horse Power, and is armed with 3 guns, viz.: one Muzzle Loading gun, of 90-cwt. and two Muzzle Loading 64-prs.

		Ft.	In.
Length	... ...	157	0
Breadth	... ...	29	6
Load Draught of Water	Forward ...	10	6
	Aft ...	13	0
Displacement Tonnage		780	
Speed (measured mile)		11 knots.	

Carries a complement of 100 men, and cost for Hull and Engines £36,000.

The 'Algerine,' 'Condor,' 'Flamingo,' 'Griffon,' 'Rambler,' and 'Ranger' are sister vessels.

These ships were designed by the Department of the Controller of the Navy, and Engined as follows: those of 'Falcon,' 'Algerine,' and 'Griffon' were built by Messrs. Laird; and those of 'Condor,' 'Flamingo,' 'Rambler' and 'Ranger' by Messrs. Elder.

Commissioned 9th January, 1879, by Commander Bouverie F. Clark, with William L. Morrison First-Lieutenant, the latter on being appointed to the command of H.M.S. 'Antelope,' was succeeded by Edward J. Sanderson. Though intended for service on the China Station, she was ordered to the Mediterranean where she has remained since, doing service with the squadron under Admiral Sir G. P. Hornby during the Russo-Turkish War, 1877-79, and subsequently under Vice-Admiral Sir F. Beauchamp-Seymour, Bart.

TORPEDO BOAT, 2ND CLASS.
AND H.M.S. HECLA.

Published Dec 1st 1880, by Griffin & Co Portsmouth.

H.M.S. "HECLA."

Built and fitted for sea by Messrs. Harland and Wolff, at Belfast.

Purchased in 1878 out of the Vote of Credit.

She is a (Single Screw) Merchant Steamer, of 1760 Indicated Horse-Power, built of iron, and unsheathed. She is armed with 64-pr. Muzzle Loading guns, and protected by Coal Armour.

Carries eight fast Torpedo boats, and is a depôt for Torpedo Stores.

		Ft.	In.
Length	... ...	392	0
Breadth	... ...	38	10
Load Draught of Water	forward ...	21	9
	aft ...	24	3
Displacement Tonnage		6400	
Speed (measured mile)		12 knots.	

Carries a complement of 226 men and cost for Hull and Engines £126,000.

Was Commisioned on 3rd September, 1878, by Captain Morgan Singer, with George W. Hill First-Lieutenant.

TORPEDO BOATS:

These boats designed and built by Messrs. Thornycroft of Chiswick, and other Firms, are of two classes, the first class cost for Hull and Engines £5800, and the second class half that amount, the speed attained by the former is 22 knots per hour, and by the latter from 16 to 17 knots.

H.M. GUN BOAT MEDINA.

Published Dec 1st 1880. by Griffin & Co Portsmouth.

H.M. GUN BOAT "MEDINA."

Built by Messrs. Palmer, at Jarrow, and fitted for sea at Portsmouth.

Launched in October, 1876.

She is light-draught (Twin Screw) Gun Boat for river service, with Engines of 310 Indicated Horse-power, and carries three 64-pr. Muzzle-Loading guns.

		Ft.	In.
Length	... ...	110	0
Breadth	... ...	34	0
Load Draught of Water.	forward	5	8
	aft ...	6	0

Displacement Tonnage	363
Speed (measured mile)	9·52 knots.

Carries a complement of 45 men, and cost for Hull and Engines £19,000.

The 'Dee,' 'Don,' 'Esk,' 'Medway,' 'Sabrina,' 'Slaney,' 'Spey,' 'Tay,' 'Tees,' 'Trent,' and 'Tweed' are sister vessels.

They were designed by the Department of the Controller of the Navy in conformity with the plans for the underwater form of Captain Trajano de Carvalho of the Imperial Brazilian Navy. The 'Spey,' 'Tay,' and 'Tees' were Engined by Penn, and the remainder by Hawthorn.

Has been employed as Tender to H.M.S. "Excellent."

H.M.S. HIMALAYA.

Published Dec 1st 1880 by Griffin & Co Portsmouth

H.M.S. "HIMALAYA."

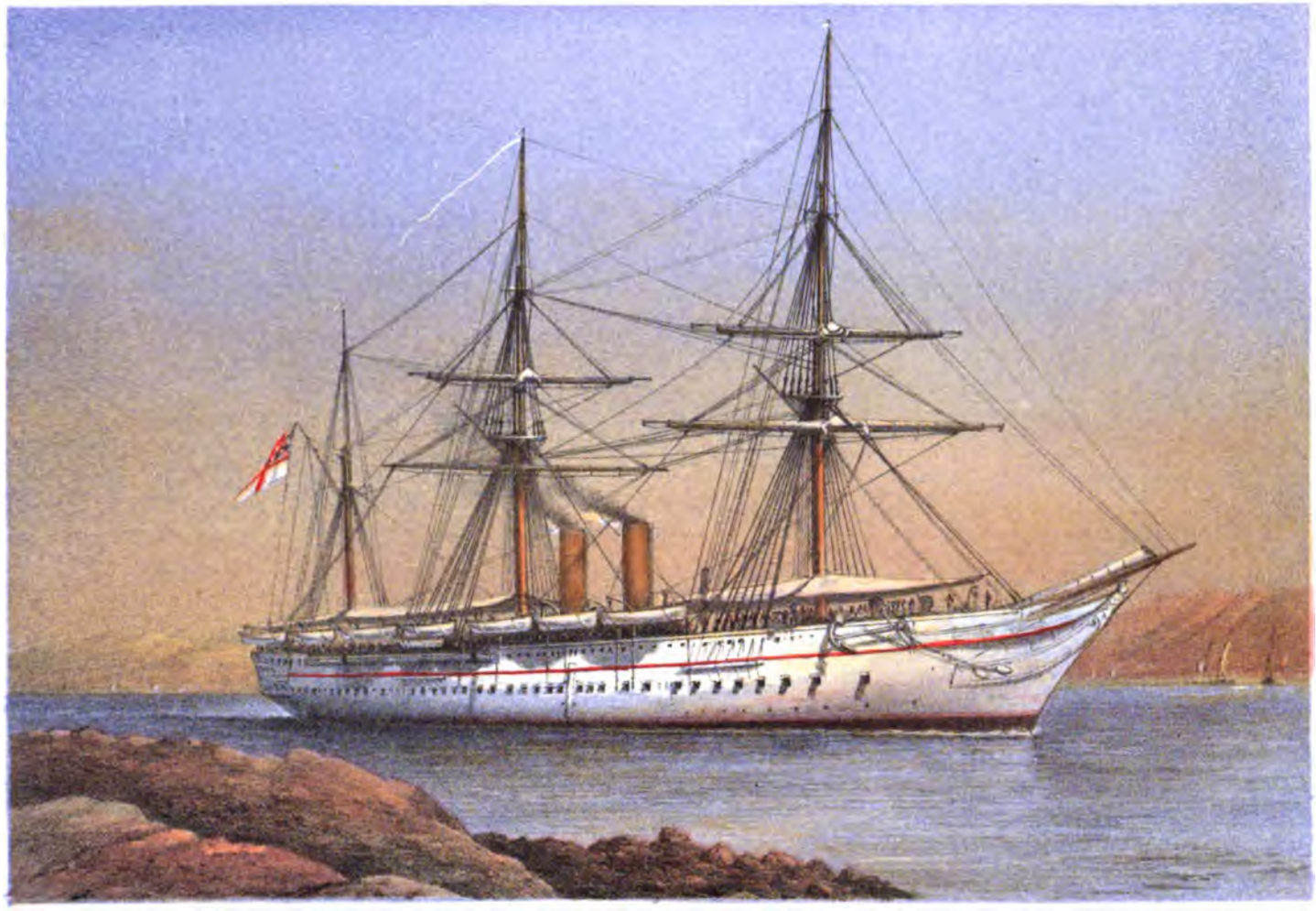
Built by Mr. C. J. Mare, at Blackwall. She was launched in May, 1853, and was bought by the Government in 1854.

She is a (Single Screw) Troop Ship built of iron, unsheathed. She has Engines of 2600 Indicated Horse-power, built at Keyham Factory.

		Ft.	In.
Length		340	5
Breadth		46	2
Load Draught of Water	forward ...	20	4
	aft ...	22	5
Displacement Tonnage		4690	
Speed (measured mile)		13·9 knots.	

Carries a complement of 223 men, and cost for Hull and Engines £130,000.

Was employed during 1854 in conveying troops to the scene of the Russian war, and was commissioned 5th January, 1855, for particular service by Captain Benjamin B. Priest, and was afterwards commanded succesively by W. H. Haswell, (25th March, 1877), John Seccombe, (21st July, 1858), Edward Lacy, (25th July, 1862); and again she was re-commissioned 18th February, 1867, by Captain Shute B. Piers, and almost continuously employed on troop service, has been commanded successively by Captain Edward Madden, Captains W. B. Grant, Edward White, and Harry W. Brent.



H.M.S. ORONTES.

Published Dec 1st 1880 by Griffin & Co Portsmouth

H.M.S. "ORONTES."

Built by Messrs. Laird, at Birkenhead, in 1862, she was lengthened 50 feet by the same Firm at their works in 1875, at which date the Engines were compounded.

She is a (Single Screw) Troop Ship, built of iron, unsheathed. She has Engines of 2600 Indicated Horse-power, built by Messrs. Watt.

		Ft.	In.
Length		350	0
Breadth		44	8
Load Draught of Water	forward ...	23	5
	aft ...	23	7
Displacement Tonnage		5900	
Speed (measured mile)		13 knots.	

Carries a complement of 214 men, and cost for Hull and Engines £111,000.

She was designed by the Department of the Controller of the Navy.

First commissioned April 20th, 1863, by Captian Henry W. Hire, and successively by Captain Henry Phelps, John L. Perry, Captain Edward H. Seymour, and Captain R. G. Kinahan.

H.M.S. CHALLENGER.

Published Dec 1st 1880, by Griffin & Co Portsmouth

H.M.S. "CHALLENGER.

Built at Woolwich, and launched in February, 1858.

She is a (Single Screw) Corvette, built of wood and coppered. She has Engines of 1260 Indicated Horse-power. She was formerly armed with 22 guns, but is not now regarded as a fighting ship.

		Ft.	In.
Length	... ...	200	0
Breadth	... ...	40	4
Load Draught of Water	forward ...	17	10
	aft ...	20	0

Displacement Tonnage 2290
Speed (measured mile) 11 knots.

Carries a complement of 295 men, and cost for Hull and Engines £74,000.

Designed by the Department of the Surveyor of the Navy.

Commissioned 3rd May, 1861, by Captain John J. Kennedy, C.B. for North American and West Indian Station, re-commissioned 10th April, 1866, by Captain Rochfort Maguire, to carry his flag as Commodore on Australian Station succeeded 28th May, 1867, by Captain Rowley Lambert, C.B.

She was selected in 1872 for Surveying and Discovery Service, with Civilian Scientific Staff, headed by Professor Wyville C. Thompson, and Commissioned 23rd May, by Captain George S. Nares, who on being appointed to the Command of the Arctic Expedition, 1875-76 was succeeded by Captain Frank Thomson.

H.M.S. CRUISER.

Published Dec 1st 1880, by Griffin & Co Portsmouth.

H.M.S. "CRUISER."

Built at Deptford and fitted for sea as a Screw Steam Sloop of 17 guns, now fitted as a sailing Training Ship, the Engines having been removed.

Launched in 1852.

	Ft.	In.
Length	160	0
Breadth	31	10½
Displacement Tonnage	960	

Carries a complement of 90 men.

She was first commissioned 18th December, 1852, by Commander the *Hon.* George H. Douglas, and afterwards by Commanders Charles Fellowes, and John Bythesea successively; she was then paid out of commission and remained so until 1867 when she was re-commissioned by Commander Morgan Singer for the Mediterranean Station, succeeded by Commander G. G. Duff, until paid off at Portsmouth. Re-commissioned 15th November, 1872, by Captain Alfred T. Dale for the Mediterranean as sailing Training Ship for ordinary seamen, and afterwards commanded successively by Commanders John Hext and Frederick A. Wetherall.

H.M.S. DISCOVERY.

Published Dec.1st 1880, by Griffin & Co Portsmouth.

H.M.S. "DISCOVERY."

Built by Messrs. Stephens & Sons, at Dundee, and purchased in 1874.

Launched in 1873.

She is now employed as a Store Ship, and is unarmed.

		Ft.	In.
Length		166	0
Breadth		30	2
Load Draught of Water	forward	14	6
	aft ...	16	6

Displacement Tonnage	1250
Indicated Horse-Power of Engines.	365

The ship was designed by the builders, and Engined by the Greenock Foundry Company.

Commissioned 15th April, 1875, by Captain Henry F. Stephenson, with Lewis A. Beaumont First-Lieutenant, as second ship in the Expedition to the Arctic Regions under Captain George S. Nares.

H.M. SHIPS EXCELLENT, CALCUTTA, & VERNON.

Published Dec.1st 1880 by Griffin & Co Portsmouth.

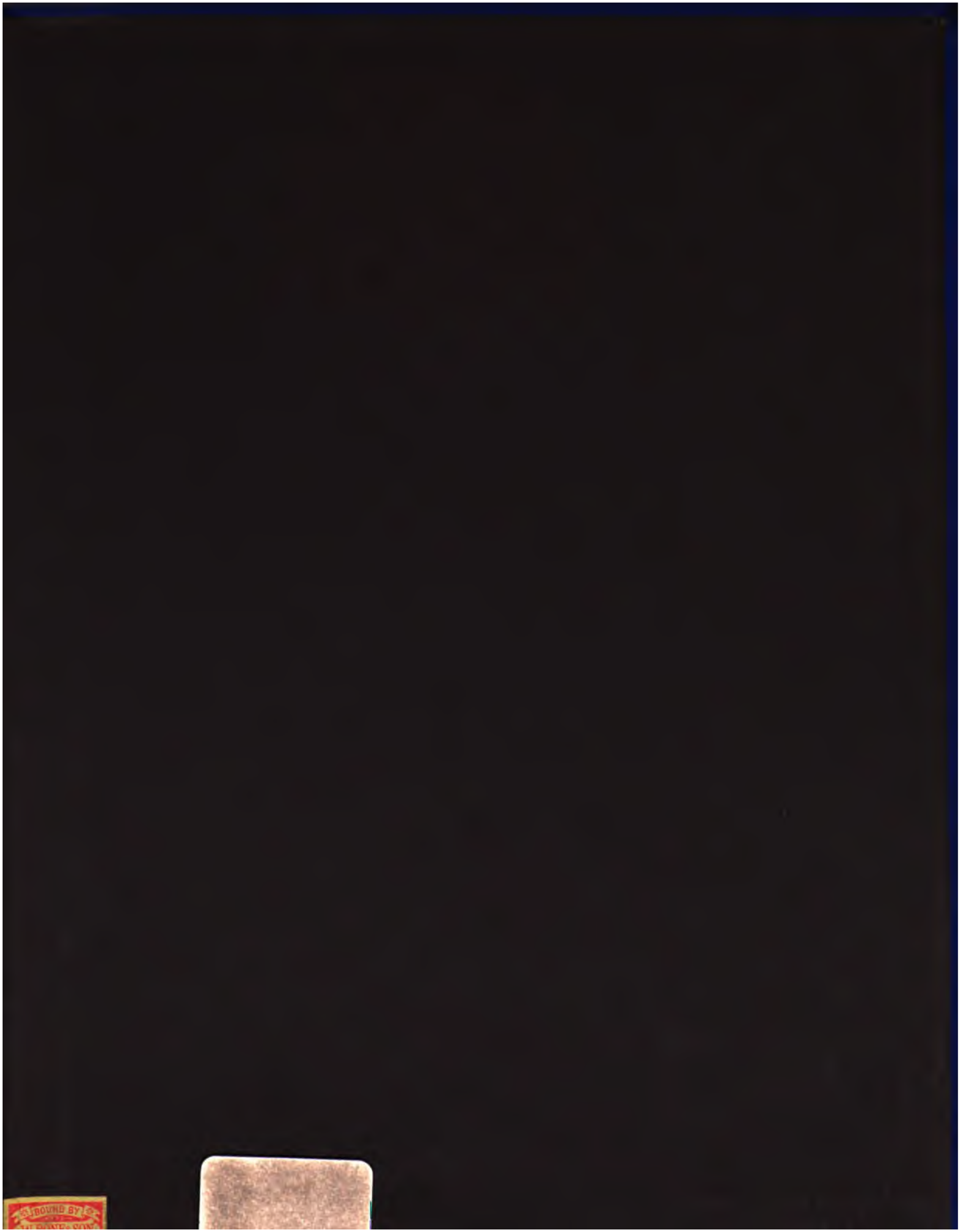
H.M.S. "EXCELLENT."

Built under the name of "Queen Charlotte," at Deptford.

Launched in 1810.

This is the third Sailing Line-of-Battle Ship which has been employed as a School for Gunnery under the name of "Excellent." The first was a 74 gun ship launched in 1787, and taken to pieces in 1835. The second was the "Boyne" 104 gun ship launched in 1810, and converted into a gunnery school in 1834, when her name was changed to "Excellent." In 1859 the present "Excellent," then bearing the name of "Queen Charlotte" 104 Gun Ship, changed names and places with the second "Excellent." This latter was taken to pieces in 1861.

			Ft.	In.
Length	...	...	190	7
Breadth	...	...	53	7
Builders Tonnage			2311	
Displacement Tonnage			4000	

The form and dimensions of the ship are the same as those of an earlier ship called the "Queen Charlotte" built at Chatham from the designs of Mr. Edward Hunt, and launched in 1790. This earlier "Queen Charlotte" was destroyed by fire.

Since her conversion into a Gunnery School under her present name, she has been commanded successively by Captains R. S. Hewlett, Astley-Cooper Key, C.B.; Arthur W. A. Hood; Henry Boys; Thomas Brandreth; Frederick A. Herbert; John O. Hopkins.